REMARKS

STATUS OF APPLICATION

No claims have been added, amended, or canceled in this paper. Accordingly, claims 1, 2, 4-13, and 15-41 are pending in the present application.

35 USC § 103 REJECTIONS

Claims 1, 2, 4, and 5 are allowable over the Wilson application in view of the Choi and Toyoda patents

Claim 1, 2, 4, and 5 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent Application Publication No. 2002/0032499 ("the Wilson application") in view of the U.S. Patent No. 6,322,713 ("the Choi patent") and the U.S. Patent No. 6,503,376 ("the Toyoda patent"). The rejection, however, fails because the cited references fail to teach or suggest all of the claimed limitations, the Choi patent is outside the scope and content of the prior art, and the references are not properly combinable.

The prior art must disclose each and every element of the claimed invention. *In re Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002). Claim 1 requires revising at least one parameter selected from the group consisting of a chemical concentration of an electroplating bath and an anode-cathode spacing of a deposition recipe if a measured thickness of a conductive layer is not within the predetermined tolerance. The Office relies on the Choi patent to disclose that "the thickness of the conductive layer may be controlled by the processing variables such as time, temperature, chemical concentration, and current density (col. 4, lines 20-39)" (page 3, lines 6-8, of the present Office Action).

The portion of the Choi patent cited by the Office, however, fails to disclose or suggest a conductive layer but, rather, teaches a sacrificial layer 12 protects portions of the nanoconductors 10. "Such a sacrificial locking layer 12 temporarily protects the buried nanoconductor regions

10A while the exposed extra length regions 10B are removed" (col. 4, lines 1-3, of the Choi patent). In fact the only conductive elements taught by the Choi patent are the nanoconductors 10. Applicants respectfully submit that the sacrificial layer 12 should not be construed as a conductive layer merely because it comprises a metal in some embodiments. To construe the sacrificial layer 12 as being a conductive layer simply because it comprises a metal would correspond to construing the zinc layer of a galvanized steel member as being a conductive layer, which it is not. Thus, claim 1 is allowable over the cited references.

The Office further relies on the Toyoda patent to teach "the thickness of a conductive layer may be affected by the anode-cathode spacing (col. 1, lines 59-64)" (page 3, lines 8-9, of the present Office Action). The cited portion of the Toyota patent discloses that "the volume of the soluble anode 2 decreases as the electroplating is performed, changing the distance between the soluble anode 2 and the cathode. This results in a change in the distribution of the thickness of the formed film or in the film quality" (column 1, lines 60-64, of the Toyoda patent). The Toyoda patent, however, does not teach the relationship between the change in distance between the anode and cathode and the resulting change in thickness distribution, which would be necessary for "revising...an anode-cathode spacing of a deposition recipe if a measured thickness of a conductive layer is not within the predetermined tolerance", as required by claim 1.

Thus, according to Toyoda, the thickness of the film is not controlled by changing the anode-cathode spacing. Rather, the anode-cathode spacing naturally changes during the plating operation, which results in uneven thicknesses of the film or poor film quality. As Toyoda fails to disclose or suggest revising an anode-cathode spacing of a deposition recipe if a measured thickness of the conductive layer is not within the predetermined tolerance, it cannot render claim 1 obvious.

Even if the cited references taught all of the limitations of claim 1, which Applicants dispute as discussed above, the rejection would still fail because the Choi patent is outside the scope and content of the prior art. It is the Office's burden to establish *prima facie* that the claimed invention is obvious. This includes the burden of showing that the references are within the scope and content of the prior art. *In re Oetiker*, 24 U.S.P.Q 2d (BNA) 1443, 1445-46 (Fed. Cir. 1992). A reference can be asserted against the claimed invention under §103 only if (1) it is within Applicant's field of endeavor, or (2) is reasonably pertinent to the problem facing Applicant even though not within Applicant's field of endeavor. *In re Clay*, 23 U.S.P.Q.2d (BNA) 1058, 1060 (Fed. Cir. 1992).

The Choi patent relates "to nanoscale connectors for microdevices such as integrated circuit components and to methods for making such connectors" (col. 1, lines 7-9, of the Choi patent). The present invention, however, relates to a method and apparatus for controlling a thickness of a deposited layer in a semiconductor manufacturing operation for making integrated circuit devices, e.g., microprocessors, memory devices, and the like (page 2, lines 8-13, of Applicant's specification). Therefore, the present application relates to the making of microdevices, while the Choi patent relates to making nanoconnectors for connecting these devices. Thus, the Choi patent is not within Applicant's field of endeavor and can be within the scope and content of the prior art only if it is "reasonably pertinent" to Applicant's invention. *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992) (reversing Board holding of obviousness).

The Choi patent, however, is not reasonably pertinent to Applicant's invention. Applicant's invention is directed to concerns that are unique to controlling a conductive layer deposition process. The Choi patent, however, is directed to, in one embodiment, depositing a metallic sacrificial layer that protects portions of the formed nanoconductors. Thus, even though

Sasaki concerns depositing a metallic layer, it is not reasonably pertinent to Applicant's invention.

The discussion in *Clay* is pertinent to the present case. In addressing the first part of the test for analogous art, the Federal Circuit reasoned:

> The PTO argues that [the reference] and [Applicant's] inventions are part of a common endeavor—"maximizing withdrawal of petroleum stored in petroleum reservoirs." However, [the reference] cannot be considered to be within [Applicant's] field of endeavor merely because both relate to the petroleum industry. ...[Applicant's] field of endeavor is the *storage* of refined liquid hydrocarbons. The field of endeavor of the [reference], on the other hand, is the *extraction* of crude petroleum. The Board clearly erred in considering [the reference] to be within the same field of endeavor as [Applicant's].

Clay, 23 U.S.P.Q.2d (BNA) at 1060. This reasoning reads directly on the present case with only slight modification for the technologies involved. With respect to the second part of the test, the Federal Circuit, after a discussion of the two inventions, held:

> A person having ordinary skill in the art would not reasonably have expected to solve the problem of dead volume in tanks for storing refined petroleum by considering a reference dealing with plugging underground formation anomalies. The Board's finding to the contrary is clearly erroneous.

Clay, 23 U.S.P.Q.2d (BNA) at 1061. Again, with some modification for the involved technologies, the reasoning applies directly to the present case. The Choi patent, however, does not deal with the problem of controlling the thickness of conductive layers, as does the present invention. Thus, the Choi patent is not "reasonably pertinent" to Applicant's invention and is, therefore, outside the scope and content of the prior art.

Irrespective of whether the Choi patent is within the scope and content of the prior art, it is not properly combinable with the Wilson application and the Toyoda patent. The Toyoda patent teaches that varying the anode-cathode spacing (albeit as a result of the anode 2 decreasing in volume) is a problem to be avoided – it is one of the problems that Toyoda seeks to

overcome. Toyoda, therefore, teaches away from revising the anode-cathode spacing, as required by claim 1. There can be no motivation or suggestion to combine references as a matter of law where one of the references teaches away from the claimed invention. *In re Fine*, 5 U.S.P.Q.2d (BNA) 1596, 1599 (Fed. Cir. 1988); *In re Gordon*, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984). Thus, claim 1 is allowable over the cited references.

Claims 2, 4 and 5 depend from claim 1. The remarks provided above concerning claim 1, therefore, apply equally to claims 2, 4, and 5. Accordingly, claims 1-2 and 4-5 are in condition for allowance and it is respectfully requested that the rejection of claims 1-2, and 4-5 under 35 U.S.C. § 103(a), as being unpatentable over the Wilson application, the Choi patent and the Toyoda patent, be reconsidered and withdrawn.

Claims 6-13 and 15 are allowable over the Wilson application in view of the Choi and Toyoda patents

Claim 6-13 and 15 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over the Wilson application in view of the Choi patent and the Toyoda patent. Claim 6 requires revising at least one parameter selected from the group consisting of a chemical concentration of an electroplating bath and an anode-cathode spacing of the deposition recipe based upon at least a calculated value representing the measured thickness of a conductive layer, if the calculated value is not within the predetermined tolerance. As discussed above concerning claim 1, these same cited references fail disclose or suggest revising such a parameter. Further, the Choi patent is outside the scope and content of the prior art and is not properly combinable with the other cited references. Accordingly, claim 6 is allowable over the cited references.

Claims 7-13 and 15 depend from claim 6. Accordingly, the remarks provided above concerning claim 6 apply equally to claims 7-13 and 15.

Therefore, it is respectfully requested that the rejection of claims 6-13 and 15 under 35 U.S.C. § 103(a), as being unpatentable over Wilson in view of Choi and Toyoda, be reconsidered and withdrawn.

CONCLUSION

Wherefore, in view of the foregoing remarks, this application is considered to be in condition for allowance, and an early reconsideration and issuance of a Notice of Allowance are earnestly solicited. The Examiner is invited to contact Daren C. Davis at (817) 578-8616 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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